

Forum

CDC's New Chief

"Ideally suited for the challenges facing CDC in the 1990s," is how Senator Edward Kennedy (D-Massachusetts) has described David Satcher, the new head of the Centers for Disease Control and Prevention in Atlanta. The former president of Meharry Medical College in Nashville took over as director of the nation's primary public health agency in September.

Satcher plans to expand the mission of CDC beyond combatting infectious diseases to include what he considers the major public health threats facing urban American society. In a September interview in the *New York Times*, Satcher said, "I don't think you have to take anything away from CDC's role in order to say that if you look at the major cause of death today it's not smallpox or polio or even infectious diseases. Violence is the leading cause of lost life in this country today. If it's not a public health problem, why are all those people dying from it?"

Although the agency's main concerns in the past have included health risks such as cancer, infectious diseases such as tuberculosis, occupational health and safety problems, and childhood diseases, an identification of violence as a significant public health problem is not entirely new to the CDC. What is new is Satcher's anticipated focus on the problem. One of his goals for the agency is to develop pilot programs to improve inner cities by curbing violence, encouraging optimism in teenagers, and enlisting the help of black churches in disseminating health information to their communities.

Some believe Satcher was chosen for the job, at least in part, because of his strong emphasis on health promotion and disease prevention, which correlates well with the Clinton administration's proposed health plan. Said Satcher, "We have a major problem with immunization in this country; probably less than 50% of the adults are current with tetanus and diphe-



David Satcher—Violence may be our greatest public health threat.

ria boosters. We've got to work on AIDS control. We need to get churches involved in stop-smoking programs and alcohol control programs. I think there's great potential there." Satcher plans to make health promotion and disease prevention the cornerstone of his direction of CDC. Said Satcher, "I think this is an optimal time for more emphasis on health promotion and disease prevention, because I think with health care reform, the appreciation of the role of prevention will be much more important than it has been in the past, and it will be seen more as a part of the health care system. Satcher was a consultant to Hillary Rodham Clinton's task force on health care reform.

Satcher was born in Anniston, Alabama. He received a bachelor of science degree from Morehouse College in Atlanta. He received an MD and PhD in cytogenetics from Case Western Reserve University in Cleveland in 1970. From 1979 to 1982 he served as chairman of the department of community medicine and family practice at Morehouse College School of Medicine. He became president of Meharry Medical College in 1982, where he established an Institute on Health Care for the Poor and Underserved in 1989.

In addition to the 7000-employee CDC, Satcher will oversee the Agency for Toxic Substances and Disease Registry, a component of the Public Health Service within the Department of Health and Human Services.

Look Ma—No Cancer

A little fluoride in U.S. drinking water is no cause for alarm, a new report says, but research is needed to assess the daily intake of extra fluoride in foods, toothpaste, mouthwash, and other products.

The report, issued by the National Research Council, says lightly fluoridated water does not increase the risk of cancer, kidney failure, bone disease, stomach ailments, infertility, birth defects, or genetic mutations. Thus, the report counters fears raised by a widely publicized 1990 study that equivocally linked intake of heavy fluoride levels with cancer in male rats. Questions remain, however, concerning low-level exposure.

Drinking slightly fluoridated water may cause dental fluorosis, staining and pitting of tooth enamel, in roughly 10% of the population, the NRC report concludes. Children 2-5 years old are particularly susceptible to fluorosis. Yet, the report, prepared by experts representing pathology, dentistry, toxicology, and other specialties, shies away from stating whether mild fluorosis is a health problem or merely a cosmetic annoyance.

As an interim standard, the EPA's current cap of 4 parts per million (ppm) for fluoride in drinking water is appropriate, according to the report, which was sponsored by the EPA. Crippling skeletal fluorosis is known to occur when fluoride levels exceed 8 ppm for many years, and risk of kidney failure may increase at levels in excess of 50 ppm.

Since dental fluorosis has become increasingly prevalent in recent years, the report also calls for increased scrutiny of

fluoride in consumer products. The EPA's fluoride limit should be reevaluated following further study, says Gary M. Whitford, a regents professor at the Medical College of Georgia and member of the report subcommittee.

Today, the Public Health Service recommends fluoride concentrations of 0.7–1.2 ppm (equivalent to 0.35–0.60 milligrams) for U.S. drinking water based on average consumption of 2 liters per day. Americans ingest another 1.2–2.2 milligrams of fluoride daily from dental products and foods processed with fluoridated water, the equivalent of a potential 4.4 additional ppm—more than double the EPA standard. Children are especially likely to swallow toothpaste, and babies drinking powder-and-water formulas may also consume extra fluoride. Still, Whitford cautions, "We're not talking about scary amounts."

The NRC report sheds new light on a 1990 study prepared by the National Toxicology Program that found that massive fluoride intake caused bone cancers in some male rats. Study results were negative for female rats as well as all mice, notes Ernest E. McConnell, a toxicology consultant and report subcommittee member. "The NTP study in 1990 raised a little caution flag," says McConnell. "But a subsequent study sponsored by Procter & Gamble, using a much higher dose, failed to replicate the NTP findings. That's the thing about little flags. They can go up, or they can come back down, given additional information."

Pollution Plagues NAFTA South of the Border

As environmentalists line up to oppose the North American Free Trade Agreement on the grounds that it has the potential to threaten U.S. environmental rules and regulations by exposing them to challenge as trade barriers, some Mexican officials and environmental activists welcome the agreement as a means of encouraging cleanup in that country.

The pact, which contains a supplemental environmental accord intended to ensure enforcement of Mexican environmental and labor standards, has prompted Mexican officials to address the country's looming environmental problems in an effort to win approval for the agreement. However, Mexico's pollution problems stem back 40 years, and remedial efforts are hampered by a lack of enforcement, a lack of resources, both financial and technological, and a lack of strong, organized support from government, communities,

NORTH AMERICAN AGREEMENT ON ENVIRONMENTAL COOPERATION

Article 5: Government Enforcement Action

1. With the aim of achieving high levels of environmental protection and compliance with its environmental laws and regulations, each Party shall effectively enforce its environmental laws and regulations through appropriate governmental action, subject to Article 37, such as:
 - (a) appointing and training inspectors;
 - (b) monitoring compliance and investigating suspected violations, including thorough on-site inspections;
 - (c) seeking assurances of voluntary compliance and compliance agreements;
 - (d) publicly releasing non-compliance information;
 - (e) issuing bulletins or other periodic statements on enforcement procedures;
 - (f) promoting environmental audits;
 - (g) requiring record keeping and reporting;
 - (h) providing or encouraging mediation and arbitration services;
 - (i) using licenses, permits or authorizations;
 - (j) initiating, in a timely manner, judicial, quasi-judicial or administrative proceedings to seek appropriate sanctions or remedies for violations of its environmental laws and regulations;
 - (k) providing for search, seizure or detention; or
 - (l) issuing administrative orders, including orders of a preventative, curative or emergency nature.
2. Each Party shall ensure that judicial, quasi-judicial or administrative proceedings are available under its law to sanction or remedy violations of its environmental laws and regulations.
3. Sanctions and remedies provided for a violation of a Party's environmental laws and regulations shall, as appropriate:
 - (a) take into consideration the nature and gravity of the violation, any economic benefit derived from the violation by the violator, the economic condition of the violator, and other relevant factors; and
 - (b) include compliance agreements, fines, imprisonment, injunctions, the closure of facilities, and the cost of containing or cleaning up pollution.

and businesses operating there.

Mexico's environmental pollution problems are wide-ranging and persistent—the result of decades of practically unregulated industrialization. Industrial discharges of untreated water into rivers and sewers is common. In Tijuana alone, almost 700 industrial plants operate with little or no official environmental supervision, leaving them free to pollute. Although by law foreign-owned plants are required to ship their hazardous wastes out of Mexico for disposal, in practice widespread waste dumping occurs. A U.S. Congressional study last year found that fewer than one-third of plants report their wastes as required, and the reports that are made are rarely checked. Public disclosure

by companies that pollute is almost unheard of, as are prevention policies to limit the amount of hazardous materials produced and released. There is little incentive for companies to improve environmental conditions, as there is little opposition to practices that threaten the environment and health from a workforce desperate for jobs.

Mexican officials say, however, that change is coming soon, as they pledge millions of dollars to environmental cleanup projects and inspection forces. President Carlos Salinas de Gortari has declared that Mexico will not sacrifice environmental health for inclusion in the trade pact and is committed to environmental protection. Sergio Reyes Lujan, director of the National Institute of Ecology, has said, however, "We have just begun to scratch the surface of what needs to be done."

Although many environmentalists view Mexico's environmental regulations as good on paper, the major flaw in the system seems to be enforcement. Environmental inspection officers are understaffed, underpaid or not paid at all, and lack equipment and supplies to perform even the most basic sampling and analyses. There have also been charges of corruption.

Recently two inspectors in the Ciudad Juarez office were dismissed after attempting to solicit bribes at a local engine plant.

Nevertheless, supporters of NAFTA hope that its environmental provisions, which invest trination environment and labor commissions with the authority to impose trade sanctions and fines against Mexican violators, will strengthen Mexico's enforcement practices. Others worry that these provisions are only paper tigers as the penalties may only be used as a last resort and only after a potentially long and complicated arbitration process.

Feds to Clean up Their Acts

Calling for the federal government to take the lead in cleaning up the environment, President Clinton signed a pollution prevention executive order that reduces toxic emissions from federal facilities by half by 1999 and requires these facilities to report to the public any release of toxic pollutants.

"With this executive order the federal facilities will set the example for the rest of the country and become the leader in

applying pollution prevention to daily operations, purchasing decisions, and policies. In the process, federal facilities will reduce toxic emissions, which helps avoid cleanup costs and promotes clean technologies," said Clinton in signing the order.

In an April speech commemorating Earth Day, the president directed the federal agencies to prepare an executive order that would set a voluntary goal of 50% reduction in release of toxic substances by 1999. This goal is to be reached through pollution prevention and reduction strategies. "By stopping pollution at its source, rather than waiting for it to become waste that must somehow be disposed of, the federal government can make a significant contribution to protecting the public health and our environment," said Clinton.

The initiative does not stop at pollution prevention, but also contains provisions for disclosure of information concerning federal hazardous waste. The law requires federal facilities that manufacture, process, or use toxic chemicals to disclose their wastes and releases to the public under the Emergency Planning and Community Right to Know Act. Under the Toxic Release Inventory (TRI) requirements of the new law, federal facilities must report their toxic emissions to the EPA and to the states where the chemicals are released. Federal facilities will also be developing emergency response plans with

community participation.

In addition to establishing voluntary reduction goals and public disclosure of toxic emissions, the executive order also requires review, and where necessary, revision of current procurement practices, to help eliminate and reduce procurement of hazardous substances by federal facilities.

Biodiversity Blind

For most people, the rallying cry of biodiversity fails to stir much reaction, in fact, most people don't have a clear concept of what "biodiversity" means. However, when told specifically what scientists are saying about the eventual result of biodiversity loss, the majority of Americans express considerable concern. So says a survey whose results were presented at a Capitol Hill forum on "Biodiversity, Science, Public Opinion, and Policy," hosted by Senator Max Baucus (D-Montana), chairman of the Senate Environment and Public Works Committee, and Senator John Chafee (R-Rhode Island), a ranking member of the committee.

The National Public Opinion Study on Biodiversity was released at the forum by Rodger Schlickeisen, president of the public interest group Defenders of Wildlife. Schlickeisen said, "The survey shows that despite their lack of knowledge about 'biodiversity' and the gravity of the extinction crisis, Americans care about the diversity of life and ecological functions and understand that preserving them is not a ques-

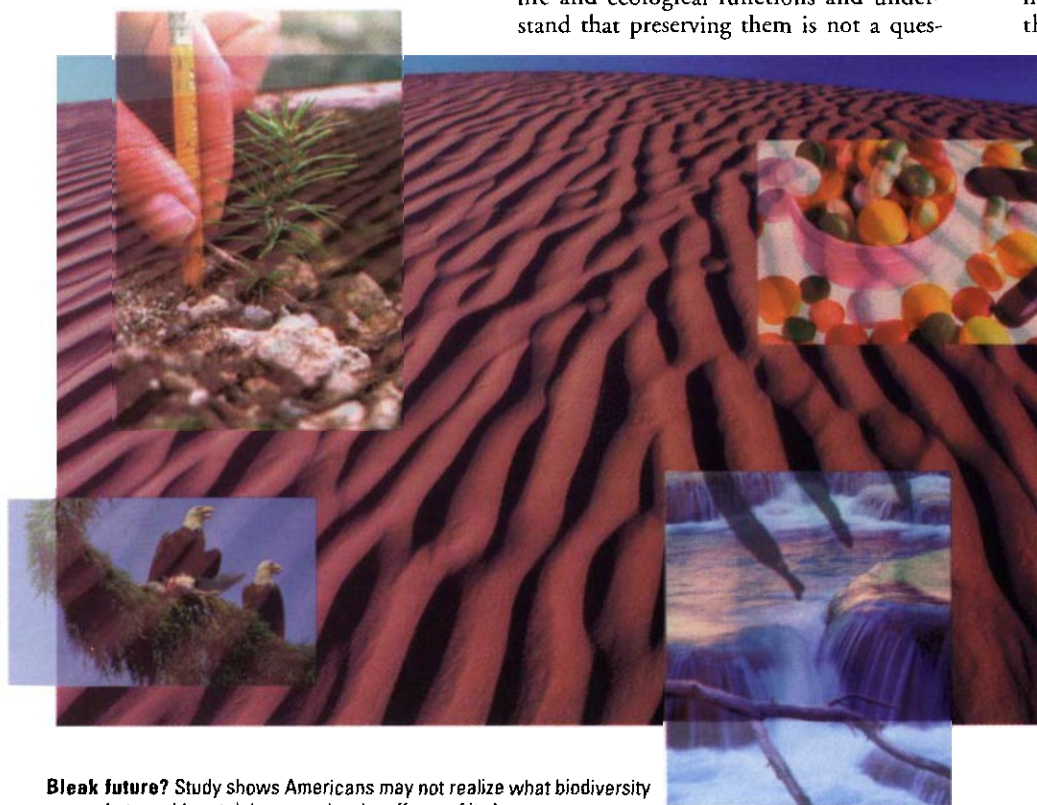
tion of people versus trees or jobs versus owls."

The study, conducted by Peter D. Hart Research Associates in conjunction with Stephen Kellert, professor at the Yale University School of Forestry and Environmental Studies and chairman of the Defenders of Wildlife Scientific Advisory Panel, tested the impact of learning key information about biological diversity on survey respondents. Four key findings were reported at the forum:

- There is an immense gap between what scientists perceive as an environmental threat and what the public perceives. At the beginning of the survey, not a single respondent mentioned loss of biodiversity as a serious environmental threat. In contrast, 52% of respondents rank pollution as the most serious environmental threat. Said Schlickeisen, "The EPA Scientific Advisory Board has ranked the extinction crisis and habitat destruction as two of the four greatest threats to the planet, at least as serious as global warming and ozone depletion. But the public doesn't know what biodiversity is, doesn't know we're losing it, and doesn't know that losing it is a problem."
- Although an information gap exists, the public prefers to hear information on biodiversity issues from scientists, whom it trusts more than political and media sources. Although the majority of respondents get their environmental information from newspapers (82%), they place little trust in the media.

When asked whom they trusted as a source of information on the environment, 42% say they place the greatest trust in scientists, 39% in environmental groups, 36% in EPA, 6% in the president, 5% in news reporters, 4% in business leaders, and 2% in members of Congress.

- Provided with scientific information about the status of biodiversity loss, respondents expressed great concern about the environmental threat. After hearing arguments for and against conserving biodiversity, respondents rejected all eight tested rationales against biodiversity and supported seven of eight arguments for it. The most compelling rationales for conservation were ethical and ecological, not economic.
- A majority of the public supports measures to conserve biodiversity, despite economic



Bleak future? Study shows Americans may not realize what biodiversity means but would certainly recognize the effects of its loss.

costs, including saving energy at home, educating children about biodiversity, protecting natural areas from development, and providing scientists with more research funds.

Edward O. Wilson from Harvard University, Pulitzer Prize-winning author of *The Diversity of Life*, told the forum, "I cannot imagine a scientific problem of greater immediate importance for humanity." Wilson has predicted the extinction of 1 in every 5 species in the next 30 years. Wilson noted that the loss of diversity affects all people by threatening ecological functions such as air and water cleansing, the balance of the food chain, erosion prevention, climate and flood control, as well as production of food and medicines.

Blue Planet Prizes

Pioneering research into the global carbon dioxide cycle and oceanic carbon dioxide levels has earned Charles David Keeling the 1993 Blue Planet Prize Academic Award. The 1993 Blue Planet Prize Development and Implementation Award goes to the International Union for Conservation of Nature and Natural Resources for 40 years' work in preserving nature and biological diversity. The prizes, awarded by the Asahi Glass Foundation in Tokyo, are given annually to individuals and institutions working to solve environmental problems.

Keeling was one of the first researchers to realize the importance of scientifically measuring carbon dioxide levels. In 1958, he began measurements at the Mauna Loa Observatory in Hawaii using nondispersive infrared analysis. During the last 30 years, Keeling has accumulated a large body of valuable data on carbon dioxide levels. Currently a professor of oceanography at the Scripps Institution of Oceanography in San Diego, California, Keeling has generated data that are indispensable to discussions of global warming.

"It is especially gratifying that my life work on atmospheric carbon dioxide should be honored by an organization that reflects the pursuit of applied chemistry, my chosen field of study," said Keeling. "A general interest in geochemistry first led me to study atmospheric carbon dioxide. Only later did I incidentally find that the concentration of carbon dioxide was increasing over our whole earth . . . becoming a serious problem needing atten-



Charles David Keeling—Increasing carbon dioxide needs more than academic attention.

tion beyond the purely academic pursuit of scientific knowledge," he added.

The International Union for Conservation of Nature and Natural Resources, known more generally as IUCN—The World Conservation Union, was founded in 1948 and today is a union of over 770 members, including 62 governments, 100 governmental agencies, 600 nongovernmental organizations, and 5000 volunteer scientists and experts.

IUCN was recognized for the formation of global conservation strategies and for its role in forging international agreements such as the World Heritage Convention (natural sites), the Ramsar Convention (wetlands), and the Biodiversity Convention. IUCN publications such as the *Red Data Books*, which list species on the brink of extinction, and *The World Conservation Strategy*, are credited with influencing scientists and governments around the world. The selection committee also cited IUCN's leadership in forging and maintaining close working relationships with the United Nations, governments, and nongovernment organizations in its reasons for awarding this prize.

The Blue Planet Prizes are awarded in appreciation of environmental research and application efforts in recognition that environmental issues are primary among the world's concerns. Asahi Glass Foundation began selection of the prize winners almost one year before the prizes were awarded. Over 2000 nominators from 68 countries nominated 44 candidates for the Academic Award and 68 candidates for the Development and



Working to conserve. Martin Holdgate, director general, and other staff of IUCN (The World Conservation Union), pose with a statue of one aspect of biological diversity in danger of extinction.

Implementation Award. The prize includes a certificate of merit, a commemorative gift, and 50 million yen (approximately \$500,000).

Dioxin and Endometriosis

A recent report connects dioxin exposure with severe endometriosis in rhesus monkeys and has spurred new research on dioxin's potential link to the disease associated with chronic pain and infertility in perhaps 10% of reproductive-age women.

In monkeys, the presence and severity of endometriosis "directly correlated with dioxin exposure in a dose-dependent manner," says Sherry Rier, an immunologist at the University of South Florida in Tampa and vice president of research of the Endometriosis Association, a private Milwaukee-based education and research organization. Rier and her colleagues at South Florida, the University of Tennessee in Memphis, Chicago's Rush Medical College, and the Harlow Primate Laboratory at the University of Wisconsin in Madison reported their findings in the November issue of *Fundamental and Applied Toxicology*.

An earlier Canadian study described endometriosis in monkeys after exposure to polychlorobiphenyl compounds, and several studies have documented radiation-induced endometriosis in monkeys. The authors of the current animal study suggest that disruption of immune mechanisms may be one means by which each of these putative factors—polychlorinated biphenyls, radiation, and, now, dioxin—engender endometriosis.

The dioxin-endometriosis connection emerged "inadvertently" after a long-term toxicologic study of the effect of dioxin exposure on reproductive outcome in rhe-

sus monkeys, according to Mary Lou Ballweg, cofounder and president of the Endometriosis Association. The original study, which was begun in 1977 and involved 24 rhesus monkeys randomly assigned to a diet containing 5 parts per trillion (ppt) dioxin (low dose), 25 ppt (high dose), or no dioxin over a 4-year period, examined only reproductive and neonatal impact.

It was years after the dioxin diet had been discontinued and autopsies implicated severe endometriosis in the deaths of several of the monkeys, a finding that reached Ballweg by word-of-mouth, that the Endometriosis Association stepped in, just in time to prevent the dispersal of the monkey colony to the highest bidders. The association brought in two of its expert advisors, one of whom coauthored the *Fundamental and Applied Toxicology* study, to perform a daylong laparoscopy examination on the survivors. The scopes were blinded, and the results were astounding," Ballweg says.

Meanwhile, the colony is dwindling as more animals die, and the survivors will reach menopause within three years. The Endometriosis Association is mobilizing to fund as many studies as possible in the remaining time, with a particular interest in exploring dioxin-related immunological alterations. "Endometriosis may be more an immunologic disorder with reproductive consequences, rather than the other way around," Ballweg suspects.

"The sad fact," says Rier, who is conducting immunologic studies, "is that the best time to have done these studies would have been from the time of exposure over the years the disease was developing, so that changes in immune function and disease progression could have been observed side by side. At this point, we can't tell cause from effect—if the immune changes arise from the dioxin exposure or from the disease."

Linda Birnbaum, director of the environmental toxicology division of the EPA's health effects research lab, concurs: "We do know that dioxin alters the immune system of rhesus monkeys, but 10 years postexposure it's hard to sort out the composite effects. It's highly likely though." Birnbaum adds, "These chemicals are associated with an increased risk of endometriosis. This is a very relevant study."

Rier's preliminary studies reveal disease-related differences in markers of immune dysfunction such as immune cell cytokine production, increases in tumor necrosis factor, and decreases in interleukin-6. Rier is also examining natural killer cell activity and antiphospholipid antibodies in ongoing studies.

In the randomized rhesus study, as well as in the general rhesus population at the primate center, the spontaneous endometriosis rate was about 30%, considerably higher than the apparent rate among women. Even so, the findings in these animals were "minimal," Rier observes, compared to the severe and symptomatic manifestations in 79% of the dioxin-exposed monkeys. Moreover, Rier and others note, the incidence of mild, asymptomatic endometriosis among women is not known.

The results of this study have prompted a joint effort by NIEHS, CDC, and Duke University investigators to compare the blood levels of dioxin and related compounds in 30 women with and without endometriosis. A larger, more definitive study will be undertaken if higher levels of dioxin are found among endometriosis patients than controls, says George Lucier, chief of the NIEHS Laboratory of Biochemical Risk Analysis. The results of the preliminary study—the first to explore in humans the hitherto unsuspected link between dioxin and endometriosis—are expected by the end of the year. Even if rhesus monkeys are actually more susceptible to endometriosis than are women, "the dose-response relationship and the severity of disease give the rhesus dioxin findings more power," Lucier comments, noting that dioxin's actions both as a potent environmental hormone and an immunotoxin provide two plausible mechanisms for a role in endometriosis induction.

Meeting for Justice

An upcoming symposium in the nation's capital will bring together community leaders, government health agency representatives, and members of academia with the goal of developing research strategies to eliminate environmental health injustice in the United States. Environmental justice includes issues such as race, socioeconomic class, occupation, differential exposure, and proximity of housing to environmental hazards, all of which may directly affect a person's health.

NIEHS, EPA, the Agency for Toxic Substances and Diseases Registry, the National Institute of Occupational Safety and Health, the Department of Energy, and the NIH Office of Minority Research are co-sponsoring a symposium entitled "Health Research and Needs to Ensure Environmental Justice," to be held 10–12 February 1994. Participants will meet for three days in an interactive environment to:

- identify at-risk populations and research gaps;
- acquire information to develop a com-

prehensive, long-term intra- and inter-agency research agenda (with projected funding) that incorporates community needs and priorities of at-risk populations.

- design a prevention and intervention model as part of a larger research, education, training, and community outreach (multilingual, multicultural, multiracial, and multiethnic) effort;
- facilitate public input and participation, especially from underrepresented communities, to address problems, design research plans, collect data, and implement plans;
- develop mechanisms to diversify the pool of health science professionals to include experts from affected and underrepresented communities trained in environmental health fields as scientific advisors and peer review panelists on research studies and health research grants; and
- make recommendations on interagency cooperation related to research needs of at-risk populations and target resources that build on strengths of existing agency mandates and directives.

"This symposium was planned with the participation of community leaders and concerned citizens working as full partners," notes Dan VanderMeer, director of the NIEHS Office of Planning and Evaluation. "We see this as an exciting opportunity to expand and accelerate federal efforts to improve environmental health in urban and rural areas through the involvement of underrepresented persons in development of strategies that recognize community needs."